# DECIDUOUS TOOTH DENTINE AS A BIOMARKER OF PRENATAL MANGANESE EXPOSURE

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**Background:** Absence of a suitable biomarker of prenatal Mn exposure remains a major obstacle for epidemiologic studies.

**Methods:** Data are presented from two long-term cohorts. The Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS) study based in California, USA, recruited pregnant women before 20 weeks gestation and collected environmental and biological matrices, including shed deciduous teeth, prospectively over a period of ~8 years to evaluate environmental Mn exposures from agricultural use of Maneb and Mancozeb fungicides. In Italy, a group of children aged 11-14 years were recruited from Valcamonica, where Mn exposure from ferroalloy plants occurred until 2001, and from a reference area. Using laser ablation-ICPMS, tooth Mn (as $^{55}Mn:^{43}Ca$) was measured in pre- and postnatally formed regions of 31 deciduous teeth from the CHAMACOS study and compared with concentrations and loading in house dust collected at the 26th gestational week as well as cord blood, and maternal and child blood and urine. Analyses of >300 teeth are underway. In the Italian study, 11 of >50 teeth have been analyzed and tooth Mn levels compared with concentrations in soil.

**Results:** In the CHAMACOS cohort, Mn levels in prenatally formed dentine were significantly associated with Mn loading in house dust ($\mu$g Mn/m$^2$ floor area) (Spearman's $\rho_{prenatal}$=0.53, p=0.002, n=31). This association was stronger when we restricted analyses to Mn levels in dentine formed in second trimester, when housedust was collected ($\rho_{prenatal}$=0.60, p=0.0006, n=29). Concentrations in cord blood were significantly associated with Mn levels in dentine adjacent to the neonatal line corresponding to the perinatal period (p<0.05), but not with Mn levels in other parts of teeth. In the Italian study, Mn levels in dentine showed a positive correlation with soil Mn (Spearman's $\rho_{prenatal}$=0.46, n=11, p=0.16).

**Conclusions:** Deciduous tooth dentine is a potentially useful biomarker of prenatal Mn exposure.